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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,140	11/25/2003	Timothy P. Bender	D/A1440	6331

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EXAMINER

ASHTON, ROSEMARY E

ART UNIT PAPER NUMBER

1752

DATE MAILED: 08/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/721,140

Applicant(s)

BENDER

Examiner

Rosemary E. Ashton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 41-43, 45, 47-68 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 41-43, 47-52, 55-59 and 63-68 is/are rejected.
- 7) ☒ Claim(s) 45, 53, 54 and 60-62 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

1. The amendment filed May 31, 2006 to exclude A as a SO₂ in compound (iii) removes the rejection over Darsow made in the prior office action.

This office action replaces any of the rejections/allowances/objections of the claims made in the prior office action.

Claim Objections

2. Claim 56 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to Claim 56 is objected to because of the following informalities: Claim 56 claims compound having the SO₂ group that was cancelled in claim 41.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2.5 Claims 49-51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Ar groups have an OH group and oxygen is a hetero atom thus all Ar groups in claims 49-51 have a hetero atom and claim 51 is not possible.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

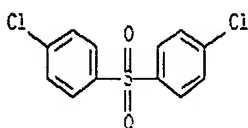
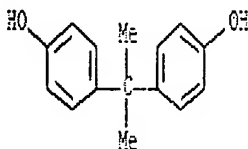
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 41-44,47-52,55-59,63-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Darsow et al, cited in the prior office action, in view of Staniland patent no. 4,331,798 and Kelsey patent no. 4,777,235.

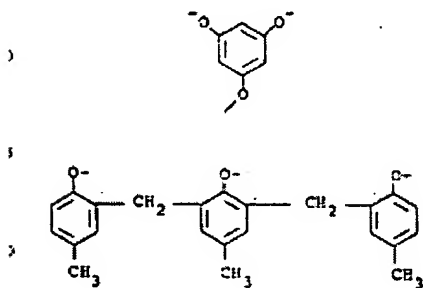
As shown in the prior office action Darsow teaches formation of polyaryl-ether sulfones using the same method claimed by applicant. An exemplified polymer has A=SO₂, Y,Y'=Cl for compound (iii), shown below, and B for the dihydroxy compound (iv) is shown below. Darsow teaches aryl branching

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additives such as trihydroxyphenols, shown below, to form branched aromatic polyaryl-ether sulfones (col. 6, lines 32-50). The first aryl branching radical shown below is phloroglucinol (1,3,5 benzenetriol) as in claim 55. As stated at the top of col.5 azeotropic distillation with toluene is used to remove the water at the end of the reaction.

**compound (iii) 1****compound (iv) 1**

As hydroxylate branching radicals or aryl branching radicals there may be mentioned the following preferred trivalent or more than trivalent radicals derived from the branching components named by way of example above:

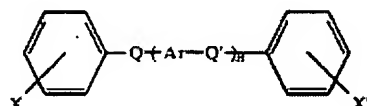
**aryl branching radicals 1**

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Darsow does not teach the A group can be a carbonyl as claimed in the instant application.

Staniland teaches reacting a bisphenol compound and a dihalobenzenoid compound to form polyaryl ethers. The dihalobenzenoid compounds are shown in col. 3 and below.

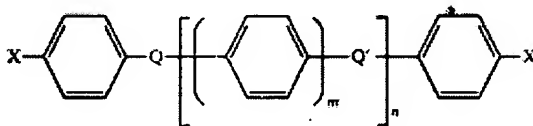
The dihalobenzenoid compounds preferably have the formula



in which X and X', which may be the same or different, are halogen atoms and are ortho or para to the groups Q and Q'; Q and Q', which may be the same or different, are —CO— or $\text{—SO}_2\text{—}$; Ar is a divalent aromatic radical; and n is 0, 1, 2 or 3.

The aromatic radical Ar is preferably a divalent aromatic radical selected from phenylene, biphenylene or terphenylene.

Particularly preferred dihalides have the formula



where m is 1, 2 or 3.

Examples of suitable dihalides include

- 4,4'-dichlorodiphenylsulphone
- 4,4'-difluorodiphenylsulphone
- 4,4'-difluorobenzophenone
- 4,4'-dichlorobenzophenone
- 4-chloro-4'-fluorodiphenylsulphone

It would have been obvious to one of ordinary skill in the art to use 4,4'-dichlorobenzophenone as the dihalide compound in the invention of Darsow, rather than 4,4'-dichlorodiphenylsulfone (compound iii above), with a reasonable expectation of obtaining a branched aromatic polyaryl-ether ketone polymer because Staniland teaches the $\text{—SO}_2\text{—}$ group and the —CO— group are alternatives in producing aromatic polyethers (abstract).

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As shown in the examples Darsow teaches the reaction is done using dimethyl sulfoxide as the solvent and sodium hydroxide as the basic additive. It does not teach the basic additive is potassium carbonate or cesium carbonate as claimed.

In. col. 3 Kelsey teaches forming polyaryl-ethers using one of the bases below.

The bases useful in this invention include at least one alkali metal hydroxides (sodium hydroxide, potassium hydroxide), carbonates (sodium carbonate, sodium bicarbonate, potassium carbonate, potassium bicarbonate, cesium carbonate, etc.), acetates (sodium acetate, potassium acetate, etc.),

bases cited in Kelsey

It would have been obvious to one of ordinary skill in the art to use potassium carbonate or cesium carbonate as the basic additive in the invention of Darsow, rather than sodium hydroxide, with a reasonable expectation of obtaining a branched polyaryl-ether ketone polymer because, as shown above, Kelsey teaches the three reagents are obvious alternatives in the art of making polyaryl-ethers.

Allowable Subject Matter

5. Claims 45,53,54,60-62 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art does not have B in a polyaryl-ether where A is a carbonyl as in claim 45, a polyfunctional phenol as in claims 53-54, the compound (v) in claims 60-62.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosemary E. Ashton whose telephone number is 571-272-1326. The examiner can normally be reached on Mon-Fri, 11:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rosemary E. Ashton
Primary Examiner
Art Unit 1752

August 20, 2006

ROSEMARY ASHTON
PRIMARY EXAMINER

ROSEMARY ASHTON
PRIMARY EXAMINER